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Post-harvest Losses of Fruits and Vegetables in Zambia

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Abstract

In Zambia, fruits and vegetables play a major role in the diets of most low income households. They are also a good source of essential vitamins and minerals and indeed the source of livelihood. The production and processing of fruits are labour intensive and affected by the challenge of lack of adequate water supply. A lot of people are involved in the marketing and trading of fruits to earn income. Fruits, especially indigenous species are well adapted and can ensure household food security during periods of natural disasters such as droughts. However, the challenge is the high post-harvest losses incurred due to climatic conditions and handling of the produce before consumption. This paper gives an overview of the fruit and vegetables production situation in Zambia. It will also analyse challenges faced in avoiding post-harvest losses and maintaining quality.

Introduction

The post-harvest sector includes all points in the value chain from production in the field to the food being placed on a plate for consumption. Postharvest activities include ; harvesting, handling, storage, processing, packaging, transportation and marketing of the produce are a major problem in the post-harvest chain. They can be caused by a wide variety of factors, ranging from growing conditions to handling at retail level. Not only are losses clearly a waste of food, but they also represent a similar waste of human effort, farm inputs, livelihoods, investments and scarce resources such as water. Post-harvest losses for horticultural produce are, however, difficult to measure. In some cases everything harvested by a farmer may end up being sold to consumers. In others, losses or waste may be considerable. Occasionally, losses may be 100%, for example when there is a price collapse and it would cost the farmer more to harvest and market the produce than to plough it back into the ground. Use of average loss figures is thus often misleading. There can be losses in quality, as measured both by the price obtained and the nutritional value, as well as in quantity.

Quality of Vegetables and Fruits

In maintaining quality of vegetables and fruits, attention has to be given to:

- Market demand for the products to be grown; he must know the market and the buyers

- Cultivation
- Harvesting and field handling
- Packing or packaging
- Transport
- Market handling; possibly storage or refrigeration
- Sales to consumers, wholesalers or agents
- Perishability of the produce.

Vegetable and Fruit Production in Zambia

The smallholder horticulture sector in Zambia is relatively underdeveloped with few farmers specialising in fruit or vegetable production. Horticultural production is usually a secondary activity producing food for home consumption with surplus for sale usually locally or in nearby towns. The main vegetable crops produced by smallholders are tomatoes, onions, water melons and brassicas (cabbage, rape), Chinese cabbage, amaranth, carrots, cleome, corchorus, cucumber, egg plants, French beans, edible gourds, lettuce, okra, onions, peas, hot pepper (paprika and green pepper), pumpkins. On the other hand, common fruits grown include, mango in the Western and Eastern provinces respectively, pineapples are grown in large quantities in North-western province, oranges, lemons and guavas grown on a small scale country wide.

The fruit and vegetable production in Zambia is mainly of exortic or foreign origin. However, in most rural areas, indigenous or wild fruits are harvested for local consumption and sale in the nearby urban centres. Most farmers regard horticultural production as a secondary activity coming towards the end of the rain season and producing crops for home consumption with a surplus for sale. They usually have limited access to credit for inputs and have major problems getting their produce to markets because of limited transport and poor roads. They rely mostly on family labour and use simple implements like hoes and animal drawn ploughs.

Production of fresh vegetables and fruits for export has increased in recent years. Medium scale and large commercial (both corporate and individual) farmers have invested in all-year round irrigated production of horticultural products as well as fresh flowers. There has been a marked increase in the export of horticultural products, especially with the expansion in number of out-grower schemes. Specialty vegetables include baby corn, mangetout, fine beans, sugar snaps, baby carrots, chillies, patti pans, okra and green asparagus (ZEGA, 2002).

The Role of Women in Post Harvest Losses

In Africa south of the Sahara, the labour of women is more important in all parts of the food production than the labour of men (Fresco, 1986). They must provide the agricultural labour needed in every phase of the food cycle to guarantee the family's nutrition. At the same time, they cannot neglect their other tasks of food preparation, child care, fetching water and fuelwood, washing, housecleaning and looking after the small animals (Presvelou, 1986). Besides these tasks

women also generate income, which is often more than half of the total Household income (Due, 1985; and Fresco, 1986). Thus in many ways women play an important role in the food supply of Households: through their productive labour, their decisions on production, consumption and division of food and through their income, this can contribute to buy food.

The Times newspaper, 2005 reported that, farmers could easily embark on successful banana plantations if they were to follow the techniques concerning the production of the fruit. In fact the demand for banana consumption in Zambia is so high such that producers have not satisfied. Therefore, this calls for more farmers to participate in the production of the fruit in order to satisfy the demand and also earn an income. Like for many other fruits, the main challenge faced is the short life of bananas. Technology is limited to having them harvested before they are ready and within a short period before reaching to the market. Further, open air and road side trading of the commodity makes the weather favourable for quick ripening beyond which they lose the quality and flavour, reducing the market value.

The Importance of Post-harvest losses in Zambia

Time and money are required to cultivate food products, and unless the farmer is providing food only for his own household, he automatically becomes part of the market economy: he must sell his produce, he must recover his costs, and he must make a profit. Estimates of the post-harvest losses of food grains in the developing world from mishandling, spoilage and pest infestation are put at 25 percent; this means that one-quarter of what is produced never reaches the consumer for whom it was grown, and the effort and money required to produce it are lost-forever. Fruit, vegetables and root crops are much less hardy and are mostly quickly perishable, and if care is not taken in their harvesting, handling and transport, they will soon decay and become unfit for human consumption. Estimates of production losses in developing countries are hard to judge, but some authorities put losses of sweet potatoes, plantain, tomatoes, bananas and citrus fruit sometimes as high as 50 percent, or half of what is grown. Reduction in this wastage, particularly if it can economically be avoided, would be of great significance to growers and consumers alike.

Potential of Zambian Fruit and Vegetable Production

Zambian fruits have a high potential to be processed into juices, jams and other assorted drink types if only appropriate technology could be adopted. Though many of these products have some commercial value in their unprocessed forms and usually find their way into urban markets, their potential as industrial raw products is largely unexploited. Little work has been done towards their improvement, domestication or conservation. Some of the fruit species may be endangered making their conservation a matter of urgency. Small-scale horticulturists in Masaiti District on the Copperbelt Province of Zambia appealed to the Government and business companies to partner with the farmers to market their produce locally and abroad. Lack of market usually increases cases of post-harvest losses of the produce. Zambia had a potential of yielding up to 31,700 to

61,200 kilogrammes per hectare under intensive commercial growing conditions. The production output of banana yields of 6,800 to 15,900kg/ha and 22,700 to 34,00kg/ha could be considered good. However, in Zambia, the average yield of bananas for most of small-scale farmers is 12,000kg/ha and this yield may be as a result of disease attacks.

Challenges in Fruit and Vegetable Production

Fruits and vegetables are living parts of plant and contain 65 to 95 percent water. When food and water reserves are exhausted, produce dies and decays. Anything that increases the rate at which a product's food and water reserves are used up increases the likelihood of losses. Increases in normal physiological changes can be caused by high temperature, low atmospheric humidity and physical injury. Such injury often results from careless handling, causing internal bruising, splitting and skin breaks, thus rapidly increasing water loss.

Transport

Transportation is a big and often the most important factor in the marketing of fresh produce in Zambia. Ideally, transport would take produce from the grower directly to the consumer, as in many developing countries. In more complex marketing systems (those serving towns, cities or distant countries)' the cost of transport contributes significantly to the price paid by the consumer, and sometimes exceeds the value of the raw product. Losses directly attributed to transport conditions can be high. Further, the road system is poor and becomes impassable especially during the rainy season from most of the rural areas to urban centres. This is a big challenge and increases post-harvest losses. The goal of every person concerned with transport should be that the produce be kept in the best possible condition during transport and that the haulage of produce be quick and efficient. To this end, produce should be properly packaged and properly loaded on a suitable vehicle.

Losses Caused by Transportation

The damage and loss incurred during non-refrigerated transport are caused primarily by mechanical damage and by overheating.

Mechanical damage: Damage of this type occurs for many reasons, including:

careless handling of packed produce during loading and unloading; vibration (shaking) of the vehicle, especially on bad roads; fast driving and poor condition of the vehicle; poor stowage, which allows packages in transit to sway; the stow may collapse packages stacked too high; the movement of produce within a package increases in relation to its height in the stack.

Overheating: This can occur not only from external sources but also from heat generated by the produce within the package itself. Overheating promotes natural breakdown and decay, and increases the rate of water loss from produce.

Marketing

Factors affecting post-harvest food losses of perishables vary widely from place to place and become more and more complex as systems of marketing become more complex. In Zambia for instance, a farmer who is growing fruits for his family's consumption probably doesn't mind if his produce has a few blemishes and bruises. But if producing for a market at any distance from his own locality, however, he and his workers, if he has any, must have a different attitude if he hopes to get the best money return on his work.

It is more important for the grower to change the attitude of himself and his workers toward reducing post-harvest losses than it is for him to think that buying fancy packaging will automatically solve his problems and improve his income. Reduction of post-harvest losses reduces cost of production, trade and distribution, lowers the price for the consumer and increases the farmer's income. In preserving the quality of the produce reaching the final market, the whole marketing chain from the producer to the final consumer must be examined for any weakness. The reduction of Post harvest losses makes significant contributions, minimizing the postharvest losses have been made through research on the physiological changes in the product after storage, new long life varieties, suitable the product after storage, new long life varieties, suitable cultivation circumstances, optimum harvesting indices, recommended storage recommendations, precooling refrigerated transport and careful handling.

Diseases and Pests

All living material is subject to attack by parasites. Fresh produce can become infected before or after harvest by diseases widespread in the air, soil and water. Some diseases are able to penetrate the unbroken skin of produce; others require an injury in order to cause infection. Damage so produced is probably the major cause of loss of fresh produce.

The influences of all three causes are strongly affected by the various stages of post-harvest operations, discussed below. Furthermore, they all have great effect on the marketability of the produce and the price paid for it.

Traditional Post- harvest losses

Traditional post-harvest technologies which make use of very simple techniques are predominant in low income countries Zambia inclusive. These technologies which are, in general, applied by subsistence farmers are very rudimentary and labour-intensive. They are focused on handling household food requirements and any surplus is sold in local market outlets.

There is limited post harvest technology being practiced for fruits in Zambia. However, traditionally, vegetable preservation is done by many people in rural agricultural areas by boiling and drying in the harvest period. Vegetables loses reduced by drying include, paprika and chilis on

commercial purposes. It is important to note that this technology is limited to commercial farmers.

In Zambia farmers have poor control or influence over the markets like the major urban markets where middlemen have significant influence and push prices down. Various attempts have been made to increase returns to the farmer and to improve access to markets. Several out-grower schemes linking smallholders to high value markets appear to be functioning successfully but most of these are located around Lusaka. These markets however tend to demand high levels of quality and consistency of supply that most smallholders are unable to meet.

Another problem faced by smallholders is that they usually have limited access to water for dry season cropping. This is a major limitation to increased productivity and extension of the growing season because rainfall is only from November to April and in agro-ecological region 1 the total is less than 800 mm. Farmers are compelled to produce vegetables under rain-fed conditions which are conducive to high levels of pests and diseases. The main production period for vegetables is therefore after the rainfall season up to the time when ground water reserves dry up (from April to about August). This problem can be overcome by the development of irrigation facilities; however credit facilities and other initiatives to encourage purchase of low cost pumps are not readily available to most smallholders. This means that dry season production is confined to perennial water sources or wetlands (dambos). Some smallholder growers however have tried to specialise in vegetable production due to the higher profit levels and they tend to be more responsive to extension advice and market demands and they are more willing to invest their own resources (e.g. they buy pumps with their own money).

Recommendations for Future Research on Post Harvest Loss Reduction Focus should

1. Not only be limited to storage conditions but also to market requirements, breeding and cultivating circumstances.
2. Focus on treatments to arrest deterioration, harvesting at correct maturity, pre-cooling to reduce field air, care during sorting, packaging, transportation are also determinant post-harvest factors.
3. Consider a significant change to the current seasonal production system to having year round vegetable production and it is important to have good training and extension support so the farmers adapt to the new production system.
4. Water harvesting technology should be encouraged among small scale farmers to enhance irrigation and continuous production.
5. Extension services should be extended further to small scale farmers for enhanced disease prevention.
6. Small scale farmers should form cooperatives to have collective access to meet big markets such as supermarkets

Conclusion

Technology to reduce post-harvest losses of fruits and vegetables should be encouraged through the use of local technology which in most cases is cheaper and sustainable. Small scale farmers should have access to extension services to learn about measures to reduce post harvest losses. As stated earlier, fruits and vegetables can greatly contribute to food security and empowerment of vulnerable sectors of society like women and the rural farmers.

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